No. 200400245

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

South Dakota Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) MAY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.).

WHEAT, COMMON

'Expedition'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of Washington, D.C. this twenty-first day of March, in the year two thousand and five.*

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions* — Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME	3. VARIETY NAME
South Dakota Agricultural Experiment Station	SD97457	Expedition

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*	5. TELEPHONE *(include area code)*	FOR OFFICIAL USE ONLY
South Dakota State University Ag Hall 129 Brookings SD 57007	(605) 688-4149	PVPO NUMBER 200400245
	6. FAX *(include area code)* 605-688-6065	FILING DATE June 21, 2004

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*	8. IF INCORPORATED, GIVE STATE OF INCORPORATION	9. DATE OF INCORPORATION
Agricultural Experiment Station	N/A	N/A

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*

Dr. Kevin Kephart, Director
SD Ag Exp Station, Box 2207
South Dakota State University
Brookings SD 57007

Dr. Amir Ibrahim, W. Wheat Breeder
Plant Science Department
NPB 244B, Box 2140-C, SDSU
Brookings SD 57007

FEES RECEIVED

FILING AND EXAMINATION FEES: $ 3652.00 DATE 6/15/2004

CERTIFICATION FEE: $ 432.00 DATE 11/01/2004

11. TELEPHONE *(Include area code)*	12. FAX *(Include area code)*	13. E_MAIL	14. CROP KIND *(Common Name)*
(605) 688-4453	605-688-4452	Amir.Ibrahim@sdstate.edu	Hard Red Winter Wheat

15 GENUS AND SPECIES NAME OF CROP	16. FAMILY NAME *(Botanical)*	17. IS THE VARIETY A FIRST GENERATION HYBRID?
Triticum aestivum	Gramineae	☐ YES ☒ NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

- a. ☒ Exhibit A. Origin and Breeding History of the Variety
- b. ☒ Exhibit B. Statement of Distinctness
- c. ☒ Exhibit C. Objective Description of Variety
- d. ☒ Exhibit D. Additional Description of the Variety *(Optional)*
- e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
- f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
- g. ☒ Filing and Examination Fee ($2,450), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*

☒ YES *(If "yes", answer items 20 and 21 below)* ☐ NO *(If "no," go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?

☐ YES ☒ NO

21. IF "YES" TO ITEM 20, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?

☐ YES ☒ NO

IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?

☐ YES ☒ NO

IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER	SIGNATURE OF OWNER
K. D. Kephart	
NAME *(Please print or type)* Dr. Kevin D. Kephart	NAME *(Please print or type)*
CAPACITY OR TITLE Director, SD Ag Exp Station	DATE 5-21-2004
CAPACITY OR TITLE	DATE

EXHIBIT A
Expedition (SD97457)
Origin and Breeding History of the Variety

Expedition was derived from the cross 'Tomahawk'/'Bennett' made during 1993. Expedition was developed by means of the bulk breeding method. The cross was advanced to the F_3 generation as a bulk sample. The F_1 plants were planted at the greenhouse in Brookings, South Dakota in 1993. The F_2-bulk population was grown in the field at Brookings and Highmore, South Dakota and harvested as bulk in July 1994. Selections among the F_2-bulks were made based on grain yield, test weight, pedigree, disease resistance, maturity, plant height, and resistance to lodging. However, no selection within these bulks was done at this stage. The F_3-bulk population was grown in the field at Brookings and Dakota Lakes Research Farm near Pierre, South Dakota in 1994, and about 100 heads were picked from the cross X93184 in 1995, using the same traits with which the F_2 bulk was advanced. Selection of F_3 plants within each F_3-bulk population was done at random. The head rows were planted in Dakota Lakes Research Farm near Pierre, South Dakota in 1995 and selection among these rows was done based on maturity, pedigree, and resistance to lodging and diseases in 1996. Expedition was derived as an $F_{3:4}$ head row selected in 1997. Expedition was evaluated as SD97457 in the South Dakota Early Yield Trial nursery in 1998. It was advanced beyond the Preliminary Yield Trial to the South Dakota Advanced Yield Trial in 1999 due to superior performance. It was tested in the South Dakota Crop Performance Testing (CPT) Variety Trial between 2000 and 2002 and in the Northern Regional Performance Nursery during 2001 and 2002.

Composite milling and bread baking properties of Expedition were determined by the USDA-ARS Hard Winter Wheat Quality Laboratory at Manhattan, KS during 2000 and 2001. Breeder seed, produced in 2000-2001, originated from a purification program in 2000-2001 (F_9 generation) to remove off-types by rouging. Foundation seed was produced in 2001-2002.

Expedition has been uniform for all morphological characters (such as maturity and plant height) during the last four generations of selfing and increase. A bronze-chaffed variant of three heights (same height as main type; 9 cm shorter and 11 cm taller than the main type) was identified in the breeder seed at a frequency of 0.15%. A taller (15 cm taller) white-chaffed variant was identified in breeder seed at a frequency of 0.05%. A taller red-chaffed variant (10 cm taller) was identified in the foundation seed (F_{10} generation) at a frequency of 0.12%. A taller white-chaffed (15 cm taller) was identified in the foundation seed at a frequency of 0.045%. Up to 0.5% variant plants of all types may be encountered in subsequent generations.

EXHIBIT B
Expedition (SD97457)
Statement of Distinctness

'Expedition' is most similar to the hard red winter wheat cultivar 'Alliance', but differs in the following characteristics:

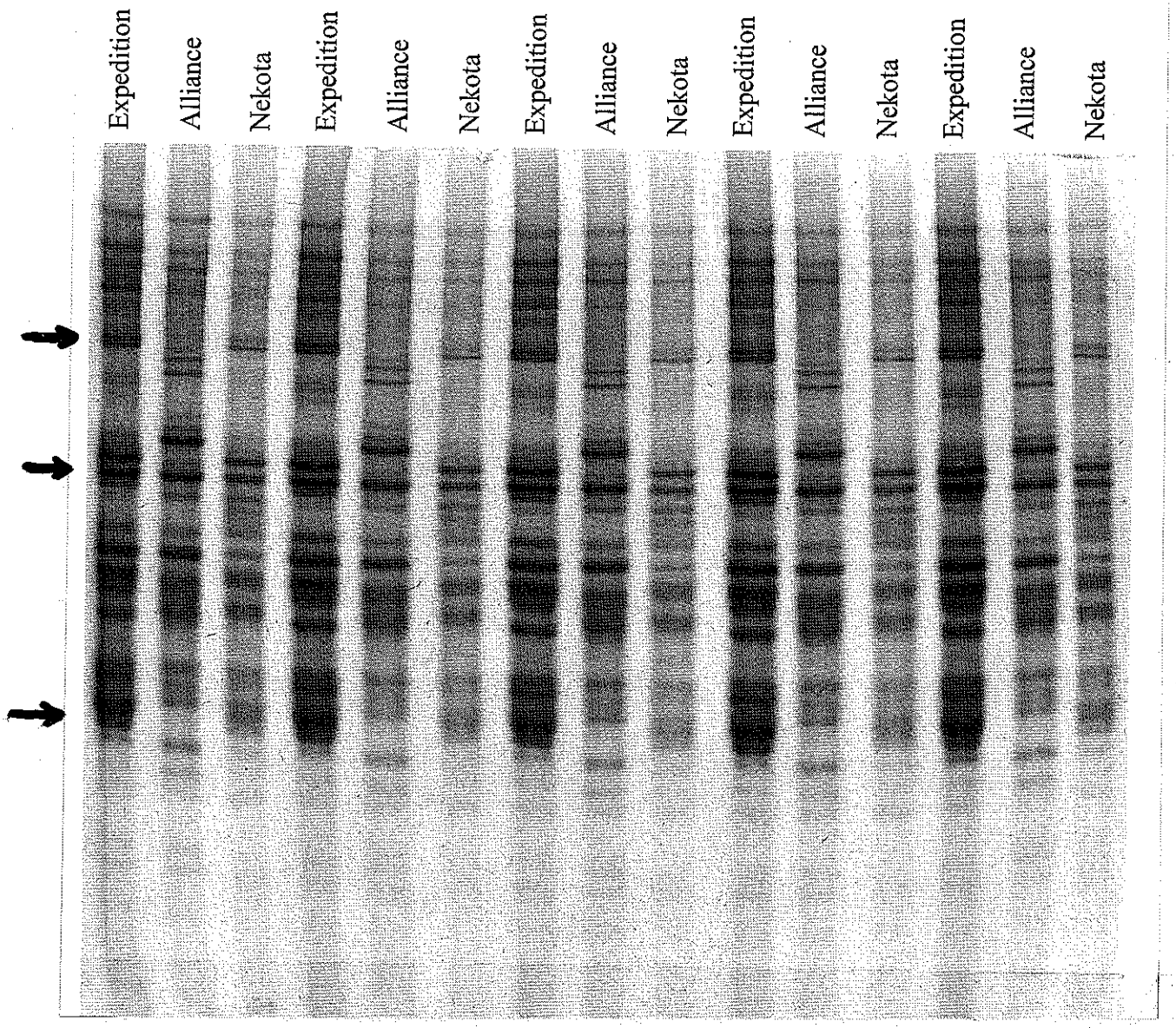
1) **Grain Yield**: Expedition has 1.7 LB/ACRE more grain yield than Alliance, when recorded directly from the combine (Table 1).
2) **Test Weight:** Expedition has 2.3 LB/Bu more test weight than Alliance, when recorded directly from the combine (Table 1).
3) **Heading Date**: Expedition heading is earlier by one day than Alliance (Table 1).
4) **Plant Height**: Expedition is 0.1 inch Alliance than Alliance (Table 1).
5) **Acid Polyacrylamide Gel Electrophoresis (PAGE)**: Acid Polyacrylamide Gel Electrophoresis shows that Expedition and Alliance have distinctly different seed storage protein banding patterns (Photograph 1). The arrows on the photograph point to bands present in Expedition but missing in Alliance and vice versa.
6) **Urea Polyacrylamide Gel Electrophoresis:** Urea Polyacrylamide Gel Electrophoresis also shows that Expedition and Alliance have distinctly different seed storage protein banding patterns (Photograph 2). The arrows on the photograph point to bands present in Expedition but missing in Alliance and vice versa

Davis, B. 1964. Disc electrophoresis. II. Method and application to human serum protein. Ann. New York Acad. Sci. 121:404-427.

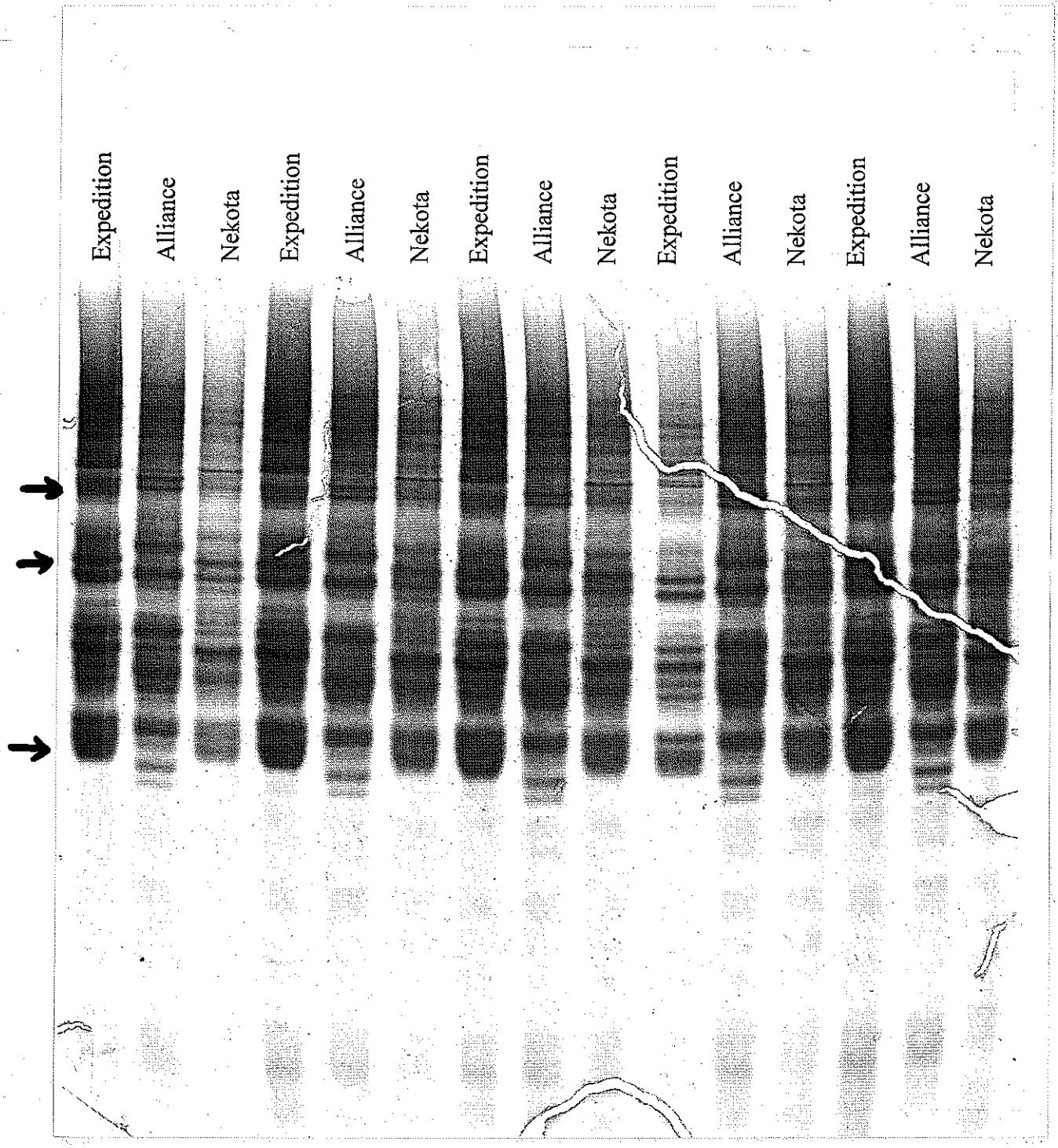
Table 1. South Dakota State University, Winter Wheat Breeding Trials Combined Over Locations and Years (2000 – 2003).

	Grain Yield (bu/a)	Test Weight (lb/bu)	Plant Height (inches)	Heading (days)
Alliance	56.0	58.7	32.4	152
Arapahoe	55.6	59.0	34.2	154
Crimson	52.1	61.0	36.1	156
Expedition	57.4	60.0	32.5	151
Harding	53.9	59.7	36.3	157
Jerry	51.4	58.7	34.3	161
Nekota	54.0	59.6	31.2	152
Mean	54.3	59.5	33.8	154
CV%	10.03	1.4	4.9	2.3
LSD	2.4	0.6	1.0	2.1

Photograph 1. Acid Polyacrylamide Gel Electrophoresis (PAGE) of hard red winter wheat cultivars Expedition, Alliance, and Nekota. The Acid PAGE was conducted by Dr. Brent Turnipseed, Seed Testing Lab, Plant Science Department, South Dakota State University.



Photograph 2. Urea Polyacrylamide Gel Electrophoresis (PAGE) of hard red winter wheat cultivars Expedition, Alliance, and Nekota. The Urea PAGE was conducted by Ms. Mary Thompson, Seed Testing Lab, Plant Science Department, South Dakota State University.



South Dakota State University
SDSU

College of Agriculture and Biological Sciences

Plant Science Department

Box 2140C, NPB 247
SDSU
Brookings, SD 57007-2141
Phone: 605-688-4020
FAX: 605-688-4452

PROCEDURE FOR POLYACRYLAMIDE GEL ELECTROPHORESIS

Written by J. Schneider
and T. Machacek 1988
Revised 1989 by J. Johnson
Revised 1991 by L. Fleege

This paper is written with the intent of passing on some practical information to laboratories which are interested in using polyacrylamide gel electrophoresis (PAGE) for the analysis of varietal purity of seed lots. Perhaps the practical experience we have gained from organizing and implementing our system will be of some assistance.

The lists which have been compiled are quite comprehensive of the needs for setting up a laboratory for PAGE. Personal preference may dictate changes in the glass and hardware, however the items listed seem to work the best for us. The equipment listed is essential for producing clear and reproducible results.

The chemical sources listed are those recommended to us (Lookhart et al., 1981) as the ones that produce the best results. Aluminum Lactate quality is important; it should be pure white (powdered sugar color). Impure Aluminum Lactate will result in blurred electrophorograms.

Reference samples of foundation seed (one pound) of each variety to be tested were collected and stored in plastic containers.

Thirty gram samples are collected in Udy bottles following purity testing. 100 seeds counted from each sample are ground in a small coffee grinder (Miracle Mill) and sifted through a 1.016 sieve. Use caution to avoid contamination between samples. Cleaning the grinder and sieve with forced air between samples is recommended.

PROTEIN EXTRACTION

Using a fine point marking pen, mark a 1.5 ml centrifuge tube for each sample. Wheat into each tube, add 750 µl of Ethylene glycol and 0.25 g of flour. Extractions mix easier if the ethylene glycol is put in the tube first. Vortex the samples and wait an hour before centrifuging. Oat: into each tube, add 700 µl of ethylene glycol and 0.30 g of flour. Vortex the samples and wait one hour before centrifuging. Single Seed: Crush each seed between weighing paper with a pliers. Place each into centrifuge tubes with 100 µl of ethylene glycol and allow to set 1 hour. Load the centrifuge evenly. Run it on low speed (4500 x g recommended) for 10 minutes. [Optional: Add one drop of 10% methyl green dye (1 g methyl green brought to a volume of 10ml with H_2O) to each sample with a small sized auto pipette].

MIXING THE GEL SOLUTION

Each 1.5 mm thick gel will require 50 ml of gel solution. Use a 125 ml vacuum flask with stopper when mixing 100 ml of gel solution. Into the flask add each of the following: Note: when working with the gel solution wear gloves and a mask as acrylamide is a neurotoxin until it has solidified.

For two gels: Aluminum Lactate (0.25g); Ascorbic Acid (0.024g); $FeSO_4$-$7H_2O$ (200μ of 10mg/10ml mixed fresh);
Wheat: Bis-Acrylamide (0.25g), Acrylamide (6.00g);
Oat: Bis-Acrylamide (0.4g), Acrylamide (7.50g). Add distilled water to obtain a volume of 100ml.

Add a stir bar, stopper the flask, and place on the stirrer at slow speed, connect the vacuum and allow it to stir for 20 minutes. (The vacuum step is optional.) After this time is up, allow the solution to continue stirring while the pH is checked and adjusted. Lower the pH to 3.1 by titrating with Lactic Acid. If the pH is over adjusted, Trizma base (5M) can be used to increase the pH without adverse effects. Divide the solution into 2 portions in 100ml flasks containing stir bars.

Prepare the gel plates making sure that they are tightly sealed to the rubber gaskets. (This is very important but easy to forget).

Place one of the flasks containing gel solution on the stir plate at very slow speed. Note: excessive agitation mixes in oxygen which ties up the catalyst and prevents complete polymerization. Add 25 μl of H_2O_2 and allow to stir for 45 seconds. Carefully pour the solution between the plates until it is 1/4" from the top. Insert the gel comb making sure there are no bubbles trapped on the well ends. Repeat the procedure for the other gel and allow both to polymerize for 15 minutes.

TANK BUFFER

While waiting for the gel to polymerize, mix the tank buffer. Place 5.625 g of Aluminum Lactate in a 4000 ml flask. Fill the flask to approximately 4500 ml (middle of the neck on a 4000 ml flask) with distilled H_2O and stir. While the buffer stirs, check the pH. Titrate to 3.1 using Lactic Acid.

SAMPLE PLACEMENT

By this time the gel should be polymerized. Carefully remove the gel comb. Careless removal can cause suction, pulling the gel walls together and possibly breaking them. Pipette out any excess fluid in the slots using a long needle syringe. If the walls of the gel are crooked, they can be straightened at this time with the needle. Fill the slots about 2/3 full with buffer solution. Then, using a digital pipette, place 7.5 μl of the sample extract (12μl for single seeds) into the slots. The extract should sink to the bottom. Using a pasteur pipette finish filling the slots with buffer.

RUNNING THE GEL

Attach the upper buffer chamber to the gel plates making sure of a tight seal. Fill the upper buffer chamber with buffer one inch from the top. Pour the remaining buffer into the lower buffer chamber along with the stir bar. Set the tank on a stir plate and set the stir plate to a fast speed. This aids in maintaining an even temperature during the run.

Put the apparatus together. Make sure that the cathode is connected to the lower buffer and the anode to the top. Start the water bath and set it for 15C. Set the power source to constant current, switch it on and turn power up to 500 volts. The amperage, when running two gels, should initially read approximately 160 to 170 ma. Allow it to run 2

hours for wheat and oats.

MIXING THE STAINING SOLUTION

Take safety precautions to prevent eye and skin contact when working with the acid solutions. To make 600 ml of stain, mix in a 1000 ml flask the following: 100 grams TCA and 600 ml distilled H_2O. Add 20 ml of 1% Comassic brilliant blue (CBB) solution (1g CBB per 100ml ETOH).

REMOVING THE GELS

After 2 hours turn the power off and remove the gel plates. Remove the spacers and pry the plates apart (It is recommended using one of the spacers for this task. Take care as to not damage the spacer in the process). To keep track of the slot order, cut off the lower left hand corner. Then remove the slot fringes. The gel can then be loosened by running a spatula between it and the glass plate while squirting water in the gap created by the spatula. The gel should slide off into the staining pan (be sure to label the pan).

STAINING

Remove any excess water and add 300ml of stain. Place the trays on a shaker at gentle speed and allow them to stain for at least 4-6 hours. Over staining will not harm the gels or their results. Sometimes overnight staining is more convenient.

DESTAINING

Remove the stain (A handy way to remove liquids is with the vacuum pump. Put a catch bottle in the line and use a pasteur pipette in the hose end.) Add 300ml of H_2O to the tray. Put the trays on the shaker and allow to destain for 2-6 hours or whatever is necessary for acceptable results. A useful tool for moving the gel is a piece of plastic 11" x 6" from a report cover. Use the plastic sheet to place the gels into one quart zip-lock freezer bags.

CLEANING THE GEL PLATES

For easy and flawless removal of the gels, a thorough cleaning of the plates is essential. Wash them well with soapy water. Then wipe them down with ammonia glass cleaner or ethanol. Put the glass together with the spacers and clamps making sure that everything is flush on the bottom. Put them in the stand, insert the combs, and cover with plastic wrap. They are now ready for the next use.

REPRODUCE LOCALLY. Include form number and date on all reproductions. Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT C
(*Wheat*)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S)
South Dakota Agricultural Experiment Station

ADDRESS (*Street and No. or RD No., City, State, and Zip Code*)
South Dakota State University
Ag Hall 129
Brookings SD 57007

FOR OFFICIAL USE ONLY

PVPO NUMBER 200400245

VARIETY NAME
Expedition

TEMPORARY OR EXPERIMENTAL DESIGNATION
SD97457

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. [0][9][9] or [0][9]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used:
Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

[1] 1=Common 2=Durum 3=Club 4=Other (SPECIFY) : _____

2. VERNALIZATION:

[2] 1=Spring 2=Winter 3=Other (SPECIFY) : _____

3. COLEOPTILE ANTHOCYANIN:

[1] 1=Absent 2=Present

4. JUVENILE PLANT GROWTH:

[2] 1=Prostrate 2=Semi-erect 3=Erect

5. PLANT COLOR (boot stage):

[2] 1 = Yellow-Green 2 = Green 3 = Blue-Green

6. FLAG LEAF (boot stage):

[2] 1 = Erect 2 = Recurved [2] 1 = Not Twisted 2 = Twisted

7. EAR EMERGENCE:

[0][6] Number of Days Earlier Than Harding *

[0][0] Number of Days Later Than Jagger *

8. ANTHER COLOR:

[2] 1 = Yellow 2 = Purple

9. PLANT HEIGHT (from soil to top of head, excluding awns):

[0][5] cm Taller Than Jagger *

[1][0] cm Shorter Than Harding *

* Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

10. STEM:

A. ANTHOCYANIN

[1] 1= Absent 2=Present

B. WAXY BLOOM

[1] 1=Absent 2=Present

C. HAIRINESS (last internode of rachis)

[1] 1=Absent 2=Present

D. INTERNODE (SPECIFY NUMBER)

[1] 1= Hollow 2=Semi-solid 3=Solid

E. PEDUNCLE

[2] 1=Absent 2=Present

[18] cm Length

11. HEAD (at Maturity):

A. DENSITY

[2] 1=Lax 2=Middense 3= Dense

B. SHAPE

[1] 1 = Tapering 2= Strap 3 = Clavate 4 = Other (SPECIFY): _____

C. CURVATURE

[2] 1 = Erect 2 = Inclined 3 = Recurved

D. AWNEDNESS

[4] 1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned

12. GLUMES (at Maturity):

A. COLOR

[1] 1 = White 2 = Tan

3 = Other (SPECIFY) : _____

B. SHOULDER

[1] 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate

C. BEAK

[3] 1 = Obtuse 2 = Acute 3 =Acuminate

D. LENGTH

[1] 1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

12. GLUMES (at Maturity) *Continued*:

200400245

E. WIDTH

[2] 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Wide (ca. 4mm)

13. SEED:

A. SHAPE

[3] 1 = Ovate 2 = Oval 3 = Elliptical

B. CHEEK

[1] 1=Rounded 2=Angular

C. BRUSH

[2] 1=Short 2=Medium 3=Long

[2] 1 = Not Collared 2 = Collared

D. CREASE

[1] 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[1] 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

E. Color

[4] 1=White 2= Amber 3= Red
4= OTHER (Specify)
Dark amber to light red

G. PHENOL REACTION *(see instructions)*:

[ ] 1 = Ivory 2 = Fawn
3 = Light Brown 4 = Dark Brown
5 = Black

F. TEXTURE

[1] 1=Hard 2=Soft

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[1]	Stem Rust *(Puccinia graminis* f. sp. *tritici)*	[3]	Leaf Rust *(Puccinia recondita* f. sp. *tritici)*
[2]	Stripe Rust *(Puccinia striiformis)*	[0]	Loose Smut *(Ustilago tritici)*
[0]	Tan Spot *(Pyrenophora tritici-repentis)*	[0]	Flag Smut *(Urocystis agropyri)*
[0]	Halo Spot *(Selenophoma donacis)*	[0]	Common Bunt *(Tilletia tritici* or *T. laevis)*
[0]	*Septoria nodorum* (Glume Blotch)	[0]	Dwarf Bunt *(Tilletia controversa)*
[0]	*Septoria avenae* (Speckled Leaf Disease)	[0]	Karnal Bunt *(Tilletia indica)*
[0]	*Septoria tritici* (Speckled Leaf Blotch)	[0]	Powdery Mildew *(Erysiphe graminis* f. sp. *tritici)*
[3]	Scab (*Fusarium* spp.)	[0]	"Snow Molds"

14. Disease *(Continued)* (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[0]	"Black Point" (Kernel Smudge)	[0]	Common Root Rot *(Fusarium, Cochliobolus* and *Bipolaris* spp.*)*
[0]	Barley Yellow Dwarf Virus (BYDV)	[0]	Rhizoctonia Root Rot *(Rhizoctonia solani)*
[0]	Soilborne Mosaic Virus (SBMV)	[0]	Black Chaff *(Xanthomonas campestris* pv. *translucens)*
[0]	Wheat Yellow (Spindle Streak) Mosaic Virus	[0]	Bacterial Leaf Blight *(Pseudomonas syringae* pv. *syringae)*
[0]	Wheat Streak Mosaic Virus (WSMV)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

[1]	Hessian Fly *(Mayetiola destructor)*	[ ]	Other (SPECIFY)
[0]	Stem Sawfly *(Cephus* spp.)	[ ]	Other (SPECIFY)
[0]	Cereal Leaf Beetle *(Oulema melanopa)*	[ ]	Other (SPECIFY)
[0]	Russian Aphid *(Diuraphis noxia*	[ ]	Other (SPECIFY)
[0]	Greenbug *(Schizaphis graminum)*	[ ]	Other (SPECIFY)
[0]	Aphids	[ ]	Other (SPECIFY)

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

12

Exhibit D
Expedition (SD97457)
Additional Description of the Variety

The following additional descriptive information is presented:

1) Release notice of Expedition.
2) Table 2: Yield, test weight, heading, plant height, spring survival, and protein data of Expedition in the South Dakota Crops Performance Testing (CPT) variety trial in 21 locations-years.
3) Table 3: Yield and test weight performance data of Expedition in the South Dakota Crops Performance Testing (CPT) variety trial in 2003.
4) Table 4: Yield and test weight performance data of Expedition in the South Dakota Crops Performance Testing (CPT) variety trial in 2002.
5) Table 5: Yield and test weight performance data of Expedition in the South Dakota Crops Performance Testing (CPT) variety trial in 2001.
6) Table 6: Milling and baking data of Expedition in the South Dakota Crops Performance Testing.
7) Table 7: Yield and test weight performance data of Expedition in the South Dakota Crops Performance Testing (CPT) variety trial in 2000.

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DATE: June 16, 2003

TO: Agricultural Experiment Station Directors
North Central Region and Great Plains

FROM: Kevin D. Kephart, Director
Agricultural Experiment Station

SUBJECT: Release of Cultivars

The South Dakota Agricultural Experiment Station announces the release of the following cultivar:

1) **SD97457 Winter Wheat** - Proposed name 'Expedition'; released with crop adaptation areas 1*, 4, 5, 6, and 7* (indicates the variety should be seeded into protective cover); PVP recommended

The release date is March 1, 2003.

The South Dakota Agricultural Experiment Station also announces the following increases with intent to release:

SDRC01 **Red Clover** (intended for future release)

SD3546 **Spring Wheat** (intended for release in 2004)

A description of the new release is enclosed. Complete yield and agronomic data is available on request from the Plant Science Department.

Seed is available through the Foundation Seed Stocks Division, Department of Plant Science, South Dakota State University, Brookings, SD 57007 (605-688-5418) FAX (605-688-6633) E-mail: jack_ingemansen@sdstate.edu

ph

Enclosure

cc: Cultivar Release/Variety Recommendation Committee
Plant Breeders

South Dakota Agricultural Experiment Station

South Dakota State University

Plant Science Department

Release of 'Expedition' Hard Red Winter Wheat

'Expedition' hard red winter wheat (*Triticum aestivum* L.) was developed by the South Dakota Agricultural Experiment Station and released to seed producers in August 2002. Expedition was released for its excellent winter survival ability and high yield potential in South Dakota and the northern Great Plains.

Expedition was selected as an $F_{3:4}$ line from the cross 'Tomahawk'/'Bennett' made in 1993. The cross (coded X93184) was advanced to the F_3 generation with a bulk breeding procedure. Expedition was identified as experimental line SD97457 in 1997 and first tested in South Dakota Early Yield Trial (EYT) in 1998. Expedition performed well enough in the EYT nurseries to be advanced beyond Preliminary Yield Trials (PYT) to the South Dakota Advanced Yield Trial (AYT) in 1999. Expedition has been tested in South Dakota Crop Performance Testing (CPT) Variety Trial between 2000 and 2002 and in the Northern Regional Performance Nursery in 2001 and 2002.

Expedition is an awned, white-chaffed, early maturity, semi-dwarf hard red winter wheat. Expedition is early maturing (147 days to heading from 1 Jan.), similar to 'Jagger', 2 days earlier than 'Wesley', and 5 days earlier than 'Harding' in South Dakota yield trials. Plant height (77.5 cm) of Expedition has averaged 7.5 cm less than Harding, and similar to 'Alliance'. The winter survival ability of Expedition is good to excellent (similar to Harding). It has a medium length coleoptile (68 mm; similar to Wesley; 106% of Alliance; 90% of 'Nekota'; and 74% of Harding) and fair straw strength (similar to 'Arapahoe').

Expedition has been tested in the South Dakota CPT from 2000 to 2002. In 23 site-years of testing, Expedition averaged 3904 kg ha^{-1} second to Wesley (3994 kg ha^{-1}) and higher than Alliance (3834 kg ha^{-1}), Nekota (3610 kg ha^{-1}), Arapahoe (3720 kg ha^{-1}), Harding (3558 kg ha^{-1}), and 'Crimson' (3363 kg ha^{-1}). Expedition has slightly better test weight averaging 754 kg m^{-3} compared with 743 kg m^{-3} for Wesley, 737 kg m^{-3} for Alliance, and 747 kg m^{-3} for Harding, but slightly lower than Nekota (758 kg m^{-3}) and Crimson (760 kg m^{-3}).

Expedition has exhibited moderate adult plant and seedling resistance to prevalent races of stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks & E. Henn.) and has been postulated to carry Sr6 and other unidentified genes based on tests conducted by the USDA Cereal Disease Laboratory, St. Paul, MN. Expedition is moderately susceptible to leaf rust (caused by *Puccinia triticina* Eriks.). Field disease ratings of reaction to head scab (caused by *Fusarium graminearum* Schwabe) between 2000 and 2002 suggested some degree of tolerance to this pathogen. Expedition is susceptible to tan spot [caused by *Pyrenophora tritici repentis* (Died.) Drechs.] and to the Great Plains Biotype of Hessian fly [*Mayetiola destructor* (Say)]

based on tests conducted by the USDA Plant Science and Entomology Research Unit, Manhattan, KS. Expedition has exhibited intermediate reaction to wheat soil-borne mosaic virus.

Composite milling and bread baking properties of Expedition were determined by the USDA-ARS Hard Winter Wheat Quality Laboratory at Manhattan, KS in 2000 and 2001. Relative to the broadly adapted check cultivars Alliance and Nekota, Expedition had larger kernel weight (32.6 versus 26.8 and 30.7 mg, respectively) which contributed to very high flour extraction (710 versus 673 and 675 g kg^{-1}, respectively) and low flour ash (3.6 versus 3.7 and 4.2 g kg^{-1}, respectively). Flour protein of Expedition (97 g kg^{-1}) was similar to Nekota and better than Alliance (90 g kg^{-1}). In bread baking tests, Expedition bake absorption (592 g kg^{-1}) was similar to Alliance and better than Nekota (586 g kg^{-1}), while its loaf volume was comparable to Alliance and Nekota (0.74 versus 0.77 and 0.78 L, respectively). Expedition had better Mixograph tolerance than both Alliance and Nekota (5.0 versus 3.0 and 2.5 scores, respectively; 0-unacceptable to 6-excellent scale). Expedition had strong mixing characteristics as determined by the mixograph (6.3 min to peak).

The South Dakota Foundation Seed Division (Plant Science Department, South Dakota State University, Brookings, SD 57007) had foundation seed of Expedition available to seed producers for planting in fall 2002. The seed classes will be Breeder, Foundation, Registered, and Certified. Expedition will be submitted for registration and plant variety protection under P.L. 91-577 with the certification option. Small quantities of seed for research purposes may be obtained from Dr. Amir Ibrahim , Plant Science Department, Box 2140C, South Dakota State University, Brookings, SD 57007.

Approval

K. D. Kephart

Director, South Dakota Agricultural Experiment Station

1-27-2003

Date

Table 2. Agronomic data of Expedition (2000 - 2003)

	Grain Yield (bu/a)	Test Weight (lb/bu)	Height (inch)	Heading (Day)
ALLIANCE	56.0	58.7	32.4	151.7
ARAPAHOE	55.6	59.0	34.2	153.7
CRIMSON	52.1	61.0	36.1	156.4
EXPEDITION	57.4	60.0	32.5	150.5
FALCON	52.7	58.2	29.1	158.5
HARDING	53.9	59.7	36.3	156.5
JERRY	51.4	58.7	34.3	160.6
MILLENNIUM	57.5	60.1	34.7	154.7
NEKOTA	54.0	59.6	31.2	151.5
RANSOM	49.4	57.9	35.6	156.3
SD97W604	55.8	60.4	29.5	150.4
SD97W609	55.6	59.8	30.0	151.3
TANDEM	52.7	60.5	35.0	153.6
TREGO	55.9	60.5	31.0	152.4
WAHOO	54.8	57.6	31.0	156.6
WESLEY	58.0	58.9	29.7	151.4
Mean	54.6	59.4	33.4	153.0
CV%	10.26	1.44	4.9	2.3
LSD 0.5	2.38	0.61	1	2.14

Table 3. Grain yield, Testweight and Agronomic Data for the 2003 Crops Performance Testing (CPT) Variety Trial. (Entries are ranked in descending order by statewide yield average).

	GRAIN YIELD (bushels/acre)[1]													TW[2]	HEAD[2]	HEIGHT[2]	LODGIN
ENTRY	AVE	BIS	OEL	MAR	HAY	STU	DLP	BRO	WAL	WIN	PLA	HIG	KEN	(lb/bu)	(days)	(inches)	(score
SD97W604	61	57	66	68	64	45	36	90	40	50	73	51	90	60.9	0	30	1.0
JAGALENE	60	55	77	68	62	44	33	90	35	46	65	57	89	60.9	2	31	1.0
SD97W609	60	52	69	64	57	44	39	83	43	53	73	61	85	60.3	1	31	1.0
MILLENNIUM	60	56	63	69	63	44	38	91	42	50	69	57	77	60.7	4	36	1.3
WAHOO	59	54	71	75	54	45	37	86	40	49	65	57	81	58.2	3	34	1.3
SD97538	58	49	69	72	56	47	36	87	41	44	65	51	84	59.3	3	33	1.3
WESLEY	58	52	65	71	62	41	36	83	44	43	66	55	80	59.2	2	30	1.0
SD98102	58	49	68	68	47	47	36	84	44	50	71	54	79	59.6	4	35	1.3
SD97380-2	58	50	69	67	57	46	39	89	37	47	60	56	78	58.9	2	35	1.4
SD97059-2	58	53	61	66	44	44	36	99	43	47	63	54	86	58.9	5	35	1.1
EXPEDITION	58	55	72	68	58	44	37	79	39	47	64	51	82	59.8	1	33	1.2
FALCON	57	56	67	61	51	44	36	83	41	47	60	56	85	59.4	5		
SD99W015	57	52	67	65	54	46	37	77	41	49	71	54	76	59.5	2	33	1.1
ARAPAHOE	57	53	65	68	57	46	38	85	36	45	60	57	78	59.3	4	35	1.3
SD97049	57	51	67	66	50	43	31	87	43	43	69	56	71	58.8	2	31	1.1
SD97W671-1	56	53	71	64	44	44	36	78	43	53	63	55	73	60.2	4	33	1.3
SD97088	56	48	65	67	48	44	34	89	45	44	65	54	72	59.8	4	36	1.4
TREGO	56	57	70	70	55	43	33	76	38	43	61	52	74	60.2	2	32	1.5
SD92107-5	55	50	66	67	47	42	31	83	44	44	59	55	74	60.3	7	37	1.3
ALLIANCE	55	53	71	69	54	44	37	71	44	41	55	53	73	58.5	2	34	1.4
HARDING	55	53	68	65	46	40	38	88	39	42	55	54	70	60.0	6	37	1.2
NEKOTA	55	51	70	60	52	42	34	79	42	49	62	49	68	59.9	2	33	1.2
JERRY	54	50	57	59	47	40	36	87	41	46	57	57	75	59.7	7	37	1.3
SD97250	54	51	67	61	51	44	34	79	37	46	62	53	67	59.2	4	35	1.3
CRIMSON	54	53	69	60	38	40	42	85	42	46	55	48	66	61.2	7	37	1.2
TANDEM	54	52	66	68	49	42	35	75	43	45	51	52	65	61.2	4	36	1.5
SD92107-3	53	48	61	65	44	43	36	87	38	42	56	53	69	59.5	6	36	1.1
NUPLAINS	53	49	65	58	50	41	38	87	44	45	51	50	60	61.2	6	31	1.0
AP502CL	53	51	73	61	60	38	36	63	40	43	61	40	71	57.5	1	31	1.0
RANSOM	50	47	55	56	45	39	33	78	37	45	49	48	64	58.7	7	37	1.5
MEAN	56	52	67	65	52	43	36	83	41	46	62	53	75	59.7	4	34	1.2
L.S.D. (0.05)	2	8	7	4	11	6	12	9	12	9	11	8	10	0.5	1	1	0.2
C.V.(%)	9	6	6	4	8	4	6	10	7	6	9	6	2	2.2	1	4	25.7

[1]BIS=Bison, OEL=Oelrichs, MAR=Martin, HAY=Hayes, STU=Sturgis, DLP= Dakota Lakes Pea stubble, BRO PLA=Platte, HIG=Highmore, KEN=Kennebec.

[2]TW= test weight; HEAD= relative heading date; HT=height; LODGING (scale of 1-5, 5 is flat); and PROT= each set of data is: TW, GY and HT = 12; LD = 8; PROT and HD = 7.

Table 4. Grain yield, Testweight and Agronomic Data for the 2002 Crops Performance Testing (CPT) Variety Trial. (Entries are ranked in descending order by statewide yield average).

	GRAIN YIELD (bushels/acre) [1]												TW[2]	HEAD[2]	HT[2]	LOD[2]	SUR[2]
ENTRY	AVE[1]	HAY	MAR	OEL	STU	HIG	SEL	WIN	WAL	WAT	PLA	BRO	(lb/bu)	(days)	(inches)	(score)	(score)
QUANTUM7406	48	40	76	50	46	33	28	36	36	47	63	55	58.5	158	25	3	7.3
JAGALENE	45	37	68	49	55	32	35	43	31	34	58	55	59.8	160	23	2	6.4
MILLENNIUM	45	34	54	50	44	30	32	27	32	49	54	52	58.3	161	25	2	6.4
WAHOO	45	33	55	48	43	33	29	20	35	43	57	54	55.8	160	25	4	6.9
WESLEY	44	34	68	46	47	29	25	34	32	39	60	52	57.3	158	21	2	7.4
EXPEDITION	44	31	60	45	47	25	28	40	32	42	58	54	58.4	158	24	3	7.8
SD97W604	44	31	55	49	47	27	32	46	32	45	52	52	59.5	158	22	2	7.3
SD97250	44	28	46	39	49	25	30	35	30	46	60	55	57.7	159	24	3	7.7
ARAPAHOE	44	29	60	44	47	29	32	24	32	45	58	52	57.0	160	25	4	7.2
TANDEM	43	33	58	45	44	33	28	37	33	41	57	49	59.1	161	25	2	7.8
SD97049	43	29	42	46	47	24	28	35	30	41	56	52	57.6	159	23	2	7.4
NUFRONTIER	43	35	52	46	45	30	23	33	32	33	57	52	58.0	160	25	2	7.1
SD96306	42	33	49	47	42	24	24	27	30	45	46	54	57.2	160	25	3	7.3
NEKOTA	42	35	66	46	42	25	26	35	30	39	55	49	58.5	159	22	3	7.1
TREGO	42	31	52	44	43	24	25	42	29	42	55	53	59.2	160	22	2	6.7
FALCON	42	29	64	40	43	36	32	40	31	41	56	54	55.6	162	23	2	7.1
SD97W650	42	30	53	45	39	27	28	26	30	39	55	57	58.5	160	22	2	6.6
ALLIANCE	42	33	51	44	39	25	27	39	32	38	57	51	56.5	159	24	4	7.1
HARDING	42	30	56	41	44	29	25	27	28	45	53	51	57.1	162	27	2	7.7
STANTON	42	30	58	46	45	26	27	34	31	37	54	49	58.5	158	24	3	6.5
2137	42	27	50	44	46	22	29	36	31	38	57	50	57.0	160	23	2	6.9
NUPLAINS	41	27	50	40	41	30	26	33	29	36	52	65	59.7	161	22	2	6.3
SD92107-5	41	28	57	40	46	30	27	28	25	45	51	53	57.2	162	26	2	7.4
NW98S059	41	29	59	46	37	29	27	30	28	42	52	52	57.8	160	25	3	6.4
SD92107-3	41	27	49	37	46	34	30	36	28	46	50	51	57.6	163	26	2	7.6
JERRY	41	31	49	38	39	33	22	27	26	44	53	53	55.8	163	28	2	6.8
SD98102	40	29	47	46	39	30	27	35	30	35	51	52	57.8	161	24	2	6.2
SD97432	40	29	51	40	40	31	25	17	30	41	53	48	56.9	161	24	2	6.4
SD97088	40	27	47	46	41	26	32	32	23	43	52	50	57.0	162	25	3	7.0
RANSOM	39	28	44	41	41	27	22	31	24	39	47	53	54.7	162	25	2	7.0
NUHORIZON	39	30	51	43	40	20	17	39	29	27	54	49	58.5	159	23	2	6.3
SD98W198	39	26	42	41	40	25	22	27	26	33	53	54	58.8	159	24	3	6.1
CRIMSON	39	26	44	40	40	31	23	23	27	38	51	50	57.4	162	27	2	7.4
AVALANCHE	39	31	53	47	43	27	26	49	29	23	48	48	59.2	159	23	3	6.1
SCOUT66	38	29	49	44	39	27	20	28	28	31	50	48	58.6	160	27	4	6.3
JAGGER	37	32	56	41	38	30	24	41	28	26	59	36	58.0	157	24	5	6.2
MEAN	42	31	54	44	43	28	27	33	30	39	53	52	57.8	159	25	2.5	6.9
C.V. (%)		12	18	7	8	17	16	17	11	12	9	12		6	23	17	18
L.S.D. (0.05)		4.9	16.0	4.2	7.1	7.6	7.4	12	4.4	6.6	6.6	9.0		10.5	0.9	0.6	0.9

[1] Yield Data from Martin, Highmore, Selby, and Winner was not used in calculating state average grain yield due to high CV%. HAY= Hayes, MAR=Martin, Oel=Oelrichs, STU=Sturgis, HIG=Highmore, SEL=Selby, WIN=Winner, WAL=Wall, WAT=Watertown, PLA=Platte, BRO=Brookings.

[2] TW= test weight; Head= heading date from January 1; Ht=height; Lod=lodging (scale or 1-5, 5 is flat; and Sur= survival (scale of 0-9. 0=complete winter kill, 9=90-100 % survival).

Table 5. Grain yield, testweight and protein content for the 2001 Crops Performance Testing (CPT) Variety Trial. (Entries are ranked in descending order by statewide yield average).

	GRAIN YIELD[1] (bushels/acre)											TW[1]	HEAD[2]	HT[2]	LOD[2]	SUR[1]
ENTRY	AVE	BRIT	BRK	HIGH	MAR	OEL	SEL	STUR	WAL	WIN	WAT	(lb/bu)	(days)	(inches)	(score)	(%)
MILLENNIUM	52	47	79	34	49	58	36	68	46	54	54	60	4	33	4	66
SD92107-5	51	46	67	34	45	56	38	67	45	63	48	59	5	35	5	69
JERRY	51	53	81	37	54	46	31	60	35	61	73	58	6	35	6	66
ARAPAHOE	51	47	71	40	47	57	32	66	40	59	66	58	3	33	5	68
TANDEM	50	47	70	34	49	55	38	61	40	61	49	60	3	34	6	66
RANSOM	50	54	74	37	48	49	29	62	42	58	79	58	5	37	7	67
WAHOO	50	36	69	35	53	59	30	69	43	59	33	56	3	31	5	57
WESLEY	50	42	70	33	51	55	30	71	38	61	55	58	2	28	6	67
CDC FALCON	50	49	75	39	49	49	30	62	40	58	69	58	4	29	5	66
ALLIANCE	49	42	70	36	46	52	35	69	36	58	54	58	1	31	6	71
SD92107-3	49	40	77	33	46	47	30	63	40	64	65	59	4	35	5	73
VISTA	49	35	66	31	48	56	37	66	44	55	61	58	2	29	5	67
WINDSTAR	49	50	70	31	43	52	31	64	39	55	75	58	5	33	3	58
SD97250	48	43	57	39	46	58	30	63	40	60	59	58	3	33	5	68
NEKOTA	48	44	62	31	50	54	40	63	36	52	59	59	1	30	4	67
SD97457	48	39	66	30	45	52	32	68	35	65	41	59	0	31	6	69
HARDING	47	40	54	29	44	53	39	64	42	62	67	59	5	34	5	64
QT 7588	47	39	61	19	53	60	37	76	32	47	62	56	2	31	2	30
CULVER	47	43	56	29	50	52	40	66	36	48	54	57	3	31	6	49
CRIMSON	46	36	67	31	49	52	28	62	41	52	57	61	4	35	5	71
TREGO	46	33	72	26	49	51	29	68	35	52	45	60	2	29	6	58
SD97049	45	37	58	29	44	55	22	68	37	57	50	57	3	30	5	50
SD97W609	44	35	63	27	46	47	32	69	30	52	39	58	2	27	7	51
NUHORIZON	44	30	63	23	49	46	31	68	34	49	39	58	3	28	2	48
NUFRONTIER	44	35	62	26	46	44	26	67	27	60	28	57	4	31	4	37
ROSE	43	27	62	29	47	46	30	62	29	50	51	59	5	36	4	51
NUPLAINS	42	29	47	30	50	52	28	65	38	42	50	60	6	30	5	56
STANTON	42	27	56	24	47	48	21	67	30	55	28	58	1	30	3	40
HONDO	42	41	45	27	48	55	25	59	30	45	55	60	4	30	4	36
SCOUT66	42	31	41	30	44	52	30	57	41	49	47	59	2	37	8	58
SD97W604	41	27	65	24	48	41	19	68	28	50	32	58	1	27	6	36
SD97W650	40	32	38	23	47	53	23	69	28	47	32	57	2	29	7	36
GOLDEN SPIKE	40	10	44	25	54	54	24	68	33	48	20	54	7	34	5	51
AVALANCHE	39	31	30	23	49	52	29	69	27	41	31	58	2	29	7	41
2137	39	24	36	22	47	50	31	65	34	44	29	57	2	27	3	33
TAM 107	38	22	37	14	48	51	31	61	30	48	37	56	1	27	3	37
JAGGER	38	24	29	18	42	57	24	67	33	45	26	56	0	26	5	42
MEAN	46	37	60	29	48	52	31	66	36	54	49	58		31	5	55
C.V. (%)[§]		22	19	20	9	9	22	5	18	14	24					
L.S.D. (0.05)		11	16	8	6	6	10	4	10	10	17					

[1] Grain yield averages (AVE) and winter survival (SUR) averages include data from all locations except Watertown (WAT) because of high coefficients of variation for these traits. Other sites include Britton (BRIT), Brookings (BRK), Highmore (HIGH), Martin (MAR), Oelrichs (OEL), Selby (SEL), Sturgis (STUR), Wall (WAL) and Winner (WIN). Survival data for individual entries with entry CV's higher than 25 were omitted from the averages. Less than half of the survival data at each location was used.

[2] Test weight (TW), relative heading date (HEAD), plant height (HT), and lodging (LOD, 1=erect, 9=flat) represent averages of data from all locations.

[§] The CV (coefficient of variability) is a statistical measure of experimental error. In general, grain yields with a CV of 16% or greater are considered to contain too much experimental error for reliable yield data interpretation. The range of normal CV's across locations varies with each trait. CV ranges for the traits in this trial were: HEAD = 0.4-0.7, HEIGHT = 4.1-5.4, TW = 1.0-7.2, LODGE = 20.9-29.0, SURV = 19.1-48.3.

Table 6. Mean milling and breadmaking characteristics of Expedition, Alliance and Nekota across two composite quality evaluations from the South Dakota Advanced Yield Trial, 2000 and 2001.

ID	Expedition	Alliance	Nekota
Grain volume weight, kg m-3	754	743	758
Percent large kernels, %	74.5	59.2	76.5
Kernel weight, mg	32.6	26.8	30.7
SKCS kernel hardness	59.8	51.4	57.4
Flour ash, g kg-1	3.6	3.7	4.2
Flour extraction, g kg-1	710	673	675
Flour protein content, g kg-1	97	90	97
Water Absorption, g kg-1	592	592	586
Bake mix time, min	7.2	3.2	2.8
Mixograph mix time, min	6.3	3.1	3.6
Mixograph tolerance	5.0	3.0	2.5
Loaf volume, L	0.74	0.77	0.78
Crumb grain score	3.2	3.9	3.7

Table 7. Grain yield, testweight and protein content for the 2000 Crops Performance Testing (CPT) Variety Trial. (Entries are ranked by statewide yield average in 2000, excluding Martin and Selby).

ENTRY	GRAIN YIELD (LOCATIONS[1])														PROTEIN		TESTWEIGHT	
	BRK	DLP	DLS	PL	HI	SEL[2]	WAL	WIN	HAY	MAR[2]	OEL	BIS	NEW	AVE[2]	AVE[3]	RANK	AVE[4]	RANK
	bushels/acre														%		lbs/bu	
HT 7588	65	74	47	49	93	86	77	65	74	75	96	78	54	70	12.2	41	59.7	29
HT 7463	64	82	46	61	94	76	77	69	67	65	89	71	54	70	12.2	39	60.0	20
HT 7406	66	86	44	51	87	64	79	70	74	85	89	73	54	70	12.1	42	59.6	32
HT 9806	77	76	41	54	88	83	80	64	70	75	84	71	53	69	12.5	36	60.2	14
WESLEY	67	76	45	53	86	74	83	64	56	69	83	72	44	66	13.3	14	59.2	38
ALLIANCE	63	71	45	50	86	70	73	62	64	71	91	67	53	66	11.8	45	59.8	26
SD97457	66	81	46	52	86	77	62	57	58	71	85	75	52	65	12.7	31	60.8	7
VISTA	67	68	45	48	80	63	78	57	73	66	81	74	44	65	13.0	22	59.4	35
SD94149	76	69	41	49	86	67	74	56	57	68	81	68	44	64	12.5	37	61.0	6
TREGO	62	66	38	45	88	68	68	64	65	56	78	83	49	64	12.2	40	61.4	3
NE94654	73	71	45	47	73	63	72	51	68	56	83	71	52	64	12.7	29	58.8	41
MILLENNIUM	80	69	41	48	87	68	63	54	66	64	75	70	43	63	13.0	24	60.1	18
TAM107	62	80	46	44	77	58	71	51	63	70	80	73	50	63	12.6	35	59.4	36
SD92107-3	71	71	38	46	79	64	73	56	65	62	77	67	49	63	13.4	13	59.9	21
2137	59	82	45	42	84	72	69	59	59	66	78	72	37	62	12.1	43	59.8	27
SD97W604	70	81	47	50	82	71	60	56	57	69	79	60	42	62	13.0	25	60.6	9
NUPLAINS	70	77	41	52	86	70	66	49	55	69	77	68	42	62	12.8	27	61.6	1
KS96HW115	60	73	42	48	75	62	74	44	67	67	88	67	39	62	12.0	44	60.3	12
SD92107-5	67	66	36	45	80	79	71	54	65	60	72	71	45	61	13.7	9	60.1	15
SD95203	55	66	38	47	82	68	70	53	64	77	78	69	53	61	12.5	38	60.4	11
ARAPAHOE	66	65	44	46	78	68	68	55	64	74	81	62	43	61	13.2	18	59.6	33
SD97W624	65	67	44	42	83	73	66	57	58	58	75	65	46	61	12.7	33	59.8	28
CULVER	67	74	41	48	87	63	63	55	61	61	75	60	43	61	12.6	34	59.2	37
NE95473	69	70	43	45	71	77	69	54	57	70	83	61	43	60	13.0	23	59.8	25
NE93613	73	69	37	47	66	61	66	50	61	67	81	66	42	60	13.2	19	59.1	40
NEKOTA	60	75	43	44	78	61	61	54	55	60	77	64	48	60	12.7	28	59.9	23
SD97W609	60	77	43	43	68	68	55	56	63	62	75	67	41	59	12.7	30	59.7	30
JAGGER	61	77	44	37	84	65	61	44	63	49	80	60	37	59	13.3	16	59.6	34
WINDSTAR	74	62	34	43	74	53	67	51	63	57	78	66	35	59	12.7	32	58.3	44
SD92107-1	56	66	38	42	75	66	66	51	58	62	81	64	36	58	13.9	3	60.1	17
HARDING	67	63	37	46	73	60	66	50	63	53	70	62	46	58	13.8	5	60.0	19
HONDO	56	72	36	38	74	68	68	40	54	74	76	60	36	56	13.6	10	59.9	22
BETTY	64	64	43	47	73	62	59	51	52	54	74	57	36	56	13.7	7	60.1	16
TANDEM	50	57	37	40	79	60	59	56	65	62	72	61	45	56	13.7	6	59.1	39
CRIMSON	53	61	37	44	74	60	67	48	57	67	68	54	41	55	13.5	12	61.5	2
SIOUXLAND	40	61	38	33	72	64	58	55	65	70	77	53	45	54	13.5	11	58.5	43
SD95218	54	58	35	36	68	52	74	48	57	71	75	54	39	54	13.3	15	59.7	31
HEYNE	65	69	41	37	63	64	60	44	45	55	72	55	28	53	13.9	4	59.8	24
RANSOM	44	60	34	40	68	55	67	43	59	54	67	59	43	53	13.2	17	58.0	45
ROSE	58	59	35	36	65	45	65	37	70	45	64	54	45	53	13.1	21	60.3	13
COUGAR	43	64	42	37	70	63	65	51	53	60	65	53	34	52	14.0	2	60.7	8
SD93267	40	61	42	35	71	52	61	47	58	61	76	58	30	52	13.7	8	61.0	5
SCOUT66	43	54	30	34	67	40	64	44	58	53	74	58	38	51	13.2	20	61.1	4
SEWARD	50	54	32	41	62	54	64	36	57	52	58	57	40	50	12.9	26	58.7	42
ROUGHRIDER	36	44	26	26	59	44	58	38	45	59	58	49	35	43	14.5	1	60.4	10
AVERAGE	61	69	40	44	77	64	67	53	61	64	77	64	43	60	13.0		59.9	
LSD .05	7	8	6	7	10	13	12	10	10	16	7	8	9					
CV (%)	9	8	10	11	8	14	13	14	11	17	6	8	14					

[1] Harvested CPT locations include Brookings (BRK), Dakota Lakes-Pea stubble (DLP), Dakota Lakes-Spring Wheat Stubble (DLS), Highmore (HI), Platte (PL), Selby (SEL), Wall (WAL), Winner (WIN), Hayes (HAY), Martin (MAR), Oelrichs (OEL), Bison (BIS) and Newell (NEW).

[2] Martin and Selby yields are not included in the grain yield average because of a high coefficient of variation (C.V.) among blocks and high least significant difference (L.S.D.) values.

[3] Protein average is based on protein data from the first eight locations (Brookings through Winner).

[4] Testweight average is based on testweight data from all locations except Selby.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)

South Dakota Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER

SD 97457

3. VARIETY NAME

Expedition

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*

South Dakota State University
Ag Hall 129
Brookings SD 57007

5. TELEPHONE *(include area code)*

(605) 688-4149

6. FAX *(include area code)*

605 688 6065

7. PVPO NUMBER

200400245

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* If no, please explain. [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company? [X] YES [ ] NO
If no, give name of country

10. Is the applicant the original owner? [X] YES [ ] NO *If no, please answer one of the following:*

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?

[ ] YES [ ] NO **If no, give name of country**

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

[ ] YES [ ] NO **If no, give name of country**

11. Additional explanation on ownership *(if needed, use reverse for extra space)*:

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

STD-470-E (07-97) *(Destroy previous editions).*
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